Metropolitan Transportation Authority

Capital Program Oversight Committee Meeting

May 2020

Committee Members

P. Foye, Chair
N. Zuckerman, Vice Chair
N. Brown
R. Glucksman
D. Jones
R. Linn
D. Mack
S. Metzger
J. Samuelsen
V. Tessitore

Capital Program Oversight Committee Meeting

2 Broadway, 20th Floor Board Room
New York, NY 10004

Wednesday, 5/20/2020
10:00 AM - 5:00 PM ET

1. PUBLIC COMMENTS PERIOD

2. APPROVAL OF MINUTES APRIL 22, 2020

Minutes from April '20 - Page 3

3. COMMITTEE WORK PLAN

2020-2021 CPOC Committee Work Plan - Page 4

4. LIRR and MNR UPDATE ON POSITIVE TRAIN CONTROL (PTC)

Progress Report on Positive Train Control - Page 6
- IEC Project Review on Positive Train Control - Page 29

5. C&D CAPITAL PROGRAM UPDATE

Update on Signals and Train Control - Page 36
- IEC Project Review Summary - Page 41

MINUTES OF MEETING

MTA CAPITAL PROGRAM OVERSIGHT COMMITTEE

April 22, 2020

New York, New York

10:00 A.M.

Because of the ongoing COVID-19 public health crisis, the MTA Chairman convened a one-day, virtual Board and Committee meeting session on April 22, 2020, which included the following committees:

- Long Island Rail Road and Metro-North Railroad
- New York City Transit
- MTA Bridges and Tunnels
- Finance
- Safety
- Capital Program Oversight Committee (CPOC)

Details of the presentation, and Committee Members' comments and questions with respect thereto, are included in the video recording of the meeting maintained in MTA's records and in the April 22, 2020 Board minutes in the May 2020 Board Book, which is available on the Board materials website at https://new.mta.info/transparency/board-and-committee-meetings/may-2020.

Metropolitan Transportation Authority

2020 - 2021 CPOC Committee Work Plan

I. Recurring Agenda Items

Approval of the Minutes
Committee Work Plan
Commitments/Completions and Funding Report

II. Specific Agenda Items

June
Update on OMNY Program
Update on Minority, Women and Disadvantaged Business Participation
Quarterly Traffic Light Reports

July
C&D Capital Program Update
- Integrated Projects
  - East Side Access
  - LIRR Expansion
  - Second Avenue Subway

September
C&D Capital Program Update
- Stations

Quarterly Traffic Light Reports

October
C&D Capital Program Update
- Infrastructure

LIRR and MNR Update on Positive Train Control (PTC)
Update on Capital Program Security Projects (in Executive Session)

November
C&D Capital Program Update
- Signals and Train Control

Update on OMNY Program
Update on Minority, Women and Disadvantaged Business Participation
Update on Small Business Development Program

December
C&D Capital Program Update
- Integrated Projects

LIRR and MNR Update on Positive Train Control (PTC)
Quarterly Traffic Light Reports

January
Rolling Stock Procurement Update

February
C&D Capital Program Update
- B&T

March
C&D Capital Program Update
Quarterly Traffic Light Reports

April
C&D Capital Program Update

May
C&D Capital Program Update

CPOC & Joint MNR/LIRR Committee Meeting
PTC Project Update

May 20, 2020

LIRR/MNR Overall PTC Project Status

Schedule	Both LIRR and MNR remain on target to implement PTC across their respective territories by December 31, 2020.
	MNR has 202 route miles with full PTC functionality (82%) LIRR has 223.3 route miles with full PTC functionality (73.2%).
Budget	$1.086B Current Budget LIRR and MNR will require $41M and $32M, respectively to complete their PTC projects.

LIRR Project Update (since CPOC in Feb)

Segments in RSD/ERSD: 223.3 miles

Since February, placed an additional 111.35 miles into ERSD

- Mainline – Ronkonkoma to Greenport – 44.8 miles (Feb 2020)
- Montauk 1BE (East of Patchogue) – 63.55 miles (Feb 2020)
- ML 5-8 (West of Forest Hills to Metropolitan interlocking) – 3 miles (Mar 2020)

Segments placed into ERSD prior to Feb 2020 included:

- Babylon to Patchogue (Pilot Line 1) - 21.5 miles
- Port Washington (Pilot line 2) – 15.6 miles
- Hempstead – 3.3 miles
- Far Rockaway – 3.25 miles
- West Hempstead – 2.6 miles
- Oyster Bay – 12.4 miles
- Long Beach – 4.5 miles
- Port Jefferson – 29 miles
- Central – 7.05 miles
- Montauk 1BW (west of Babylon to Jamaica) – 12.75 miles

LIRR Project Update (continued)

ERSD

- LIRR modified the schedule, sequence and segment limits to fine-tune operations (accurate stop) at selected station areas before placing segments into ERSD.
- Changed strategy to deploy the Main Line MP 11-49 as a whole, rather than in separate segments to facilitate testing across segment boundaries before going into ERSD in July.

On-board OBC Software updates

- OBC Release S7D has full PTC functionality for deadline
- 71% of Rolling Stock Units (RSU)s updated with OBC S7D
- LIRR car shops on target to complete all software uploads by the end of May to support ERSD for remaining segments

LIRR Project Update (continued)

Field Installation & Testing

- Valley – all testing completed; ERSD targeted in late May pending accurate stop improvements at Valley Stream.
- Atlantic – Post SPT transponder update released; SUP in May; ERSD in June.
- Main Line on schedule for ERSD in July
  - ML 11-15 (West of Hillside to Floral Park) – ERSD ready pending accurate stop improvements at Queens Village.
  - ML 15-25 (Floral Park to Hicksville) – Transponder (TP) site installation testing in progress; closely coordinating with Third Track project work.
  - ML 25-49 (Hicksville to Ronkonkoma) – SPT near completion at end of April.
- Jamaica - MP 8-11 (Metropolitan interlocking to West of Hillside)– Transponders installation completed at west end. East end installations in progress. Sufficient transponders delivered for this area; ERSD date in September at risk due to extensive testing required to interface to vital circuitry.
- Harold - MP 0-5 (West of Harold to West of Forest Hills) – Transponders installed; TP SIT and WIU installations in progress ; ERSD in Sept.

LIRR Project Update (continued)

Accurate Stop improvements

- Accurate stop is a prerequisite to place segments into ERSD for operations.
- Updated transponder designs provided by the SI for Valley Stream and Queens Village stations in support of upcoming ERSD are under test.
- Creative methods outside the original ACSES design guidelines have been explored to improve accurate stop at various locations.

Jamaica Design

- Changes to the SI's initial design were required to meet LIRR's operational requirements.
  - MTEA revisions approved by the FRA.
  - Interface to relay logic at Jamaica will require more extensive circuit reviews/simulation testing by LIRR signal design to ensure no impacts to operations.
  - ERSD date in September may be delayed to 4th Qtr.

Safety Plan

- Revised PTC Safety Plan resubmitted to FRA for review on March 31st.

LIRR Project Update (continued)

Software Testing

- LIRR remotely witnessing factory tests for Baseline 3.8 using TeamViewer
- PTC Security (HMAC) and STS-STS safety server interface have been combined into Baseline 3.8
  - RWPS 3.1.1 and 3.1.2 FAT testing completed
  - Office 3.7 FAT completed on April 26
  - System Integrated Test started on April 29
- System Baseline 3.9 will be released in September for operational improvements and variance corrections.

Status of Siemens scanner antenna recall

- Deliveries for the recall were completed in February. Retrofits on target for June completion.
- Root cause of blue dot issue attributed to T2 transformer and the secondary manufacturing process of adjusting the windings.
  - Field validation of the revised T2 configuration completed.
  - Retrofits will be performed as part of the 92 day period inspection (PI) period. As trains are brought into the shop, units will be tested and replaced as required.
  - Siemens providing on-site support for the retrofit work.

LIRR Project Update (continued)

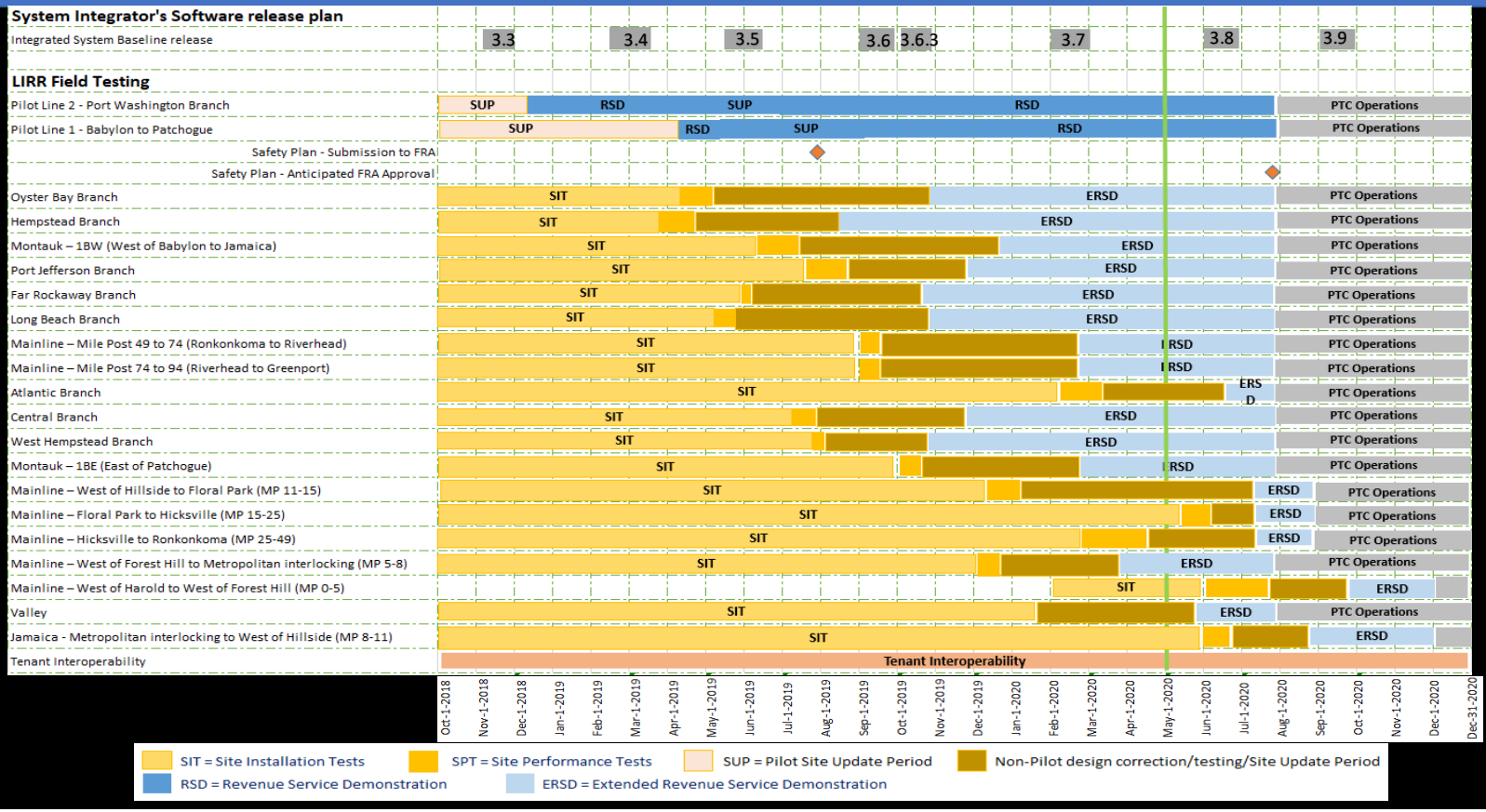
LIRR interoperability with Amtrak

- Factory Acceptance testing (FAT) of the STS-STS interface is in progress.
- Wayside designs, installations and testing are in progress per project schedule.
- PSCC database work completed; preliminary testing of TSRs, messaging in factory was successful.
- Qualification testing of M3 fleet to operate in PTC on Amtrak wayside successfully conducted on April 21 with one minor issue attributed to a wayside issue.

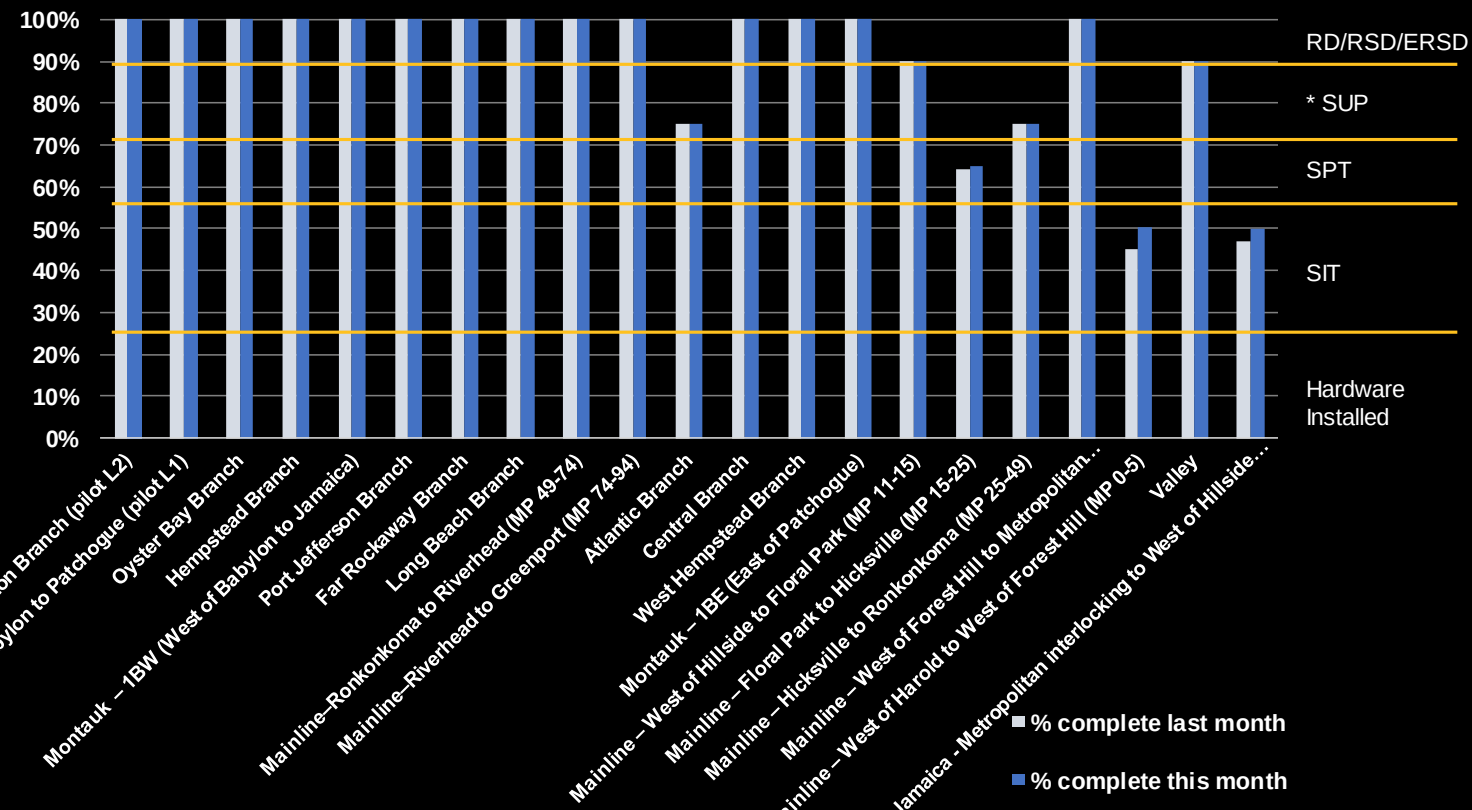
Amtrak interoperability with LIRR

- LIRR Specification to serve as baseline for Amtrak OBC revisions; Amtrak design progressing using this baseline specifications.
- Burns / Siemens currently collaborating on Amtrak specific OBC requirements to supplement baseline
- May 2021 is targeted date for Siemens to provide software release to Amtrak/Burns for testing.
- Design modifications to LIRR WIUs by Siemens in progress for b2b mitigation plan for deadline compliance.

LIRR Working Schedule and Sequence



LIRR Segment RSD Readiness (Previous vs Current Month)



SIT = Site Installation Tests

SPT = Site Performance Testing

*SUP = Site Update Period includes design corrections and testing

RD/RSD/ERSD = Repeatability Demonstration/ Revenue Service Demonstration/ Extended RSD

Key Milestones and Issues (LIRR Only)

Status	Activity	Issues
Green	Deployment of on-board software across the fleet multiple times Baseline 3.7	**Issues**: • The SI's software release plan requires the deployment of multiple iterations of on-board software across the entire fleet. **Monthly Update:** • LIRR and the PTC SI are deploying OBC S7D release to all trains to support ERSD for the rest of the LIRR territory. • Full deployment to entire fleet targeted for completion by end of May. **Drivers:** • LIRR requires System Baseline 3.7 on-board software for deployment across the fleet no later than May 2020 to support ERSD schedule. **Mitigations:** • In addition to the routine 92-day periodic inspection cycle, LIRR will make trains and resources available to accelerate the software upload process as necessary. **Potential Impacts:** • If the SI has unexpected technical issues (system performance or equipment reliability) and on-board software deliveries are pushed beyond mid-2020, this has a potential impact to the PTC deadline.
	Date Needed	
	May 2020	

Red — Significant impact to Project Schedule and ability to meet PTC deadline.

Yellow — Impact to Project Schedule or interim project milestone and may impact ability to meet PTC deadline.

Green — No Near Term Impact to Project Schedule and on target to meet PTC deadline.

Key Milestones and Issues (LIRR Only)

Status	Activity	Issues
Green (Current) Yellow (Previous) Red: Significant impact to Project Schedule and ability to meet PTC deadline. Yellow: Impact to Project Schedule or interim project milestone and may impact ability to meet PTC deadline. Green: No Near Term Impact to Project Schedule and on target to meet PTC deadline.	Amtrak development of plans and schedules for their b2b alternative and permanent solutions for interoperability with LIRR **Date Needed** May 2020	**Issues**: • To operate on LIRR territory Amtrak needs to develop plans/schedules for both the interim (for deadline) and permanent (post 2020) b2b solutions which are approved by LIRR and FRA. **Monthly Update:** • FRA has provided verbal assurance at NEC Executive meeting that Amtrak's proposed interim b2b solution is acceptable for compliance in December 2020. • Amtrak/Burns/Siemens progressing the design for Amtrak's permanent b2b solution based on LIRR's baseline b2b design. • Burns/Siemens have provided a preliminary schedule and plan to provide Amtrak with the first software release in May 2021 for factory testing. **Drivers:** • An acceptable solution for b2b routes through Harold must be safe, FRA compliant and not impact LIRR operations. **Mitigations:** • LIRR has shared their b2b technical requirements/design with Amtrak to help expedite the development of Amtrak's b2b solution. • LIRR has offered technical support to Amtrak for b2b requirements development. • Frequent project steering committee meetings will be held to track progress. • A risk register is developed and being monitored by Burns (Amtrak's PTC SI) **Potential Impacts:** • If Amtrak does not develop acceptable plans/schedules to LIRR and FRA, Amtrak service on LIRR may be impacted.

Key Milestones and Issues (LIRR & MNR)

Status	Activity	Issues
Green (Current) Yellow (Previous)	Delivery and implementation of System Software for PTC Security & STS-STS interface for Interoperability Baseline 3.8	**Issues**: • Timely delivery of System Software Release 3.8 is required for implementation of PTC security requirements and the STS-STS safety server interface for FRA compliance and interoperability with Amtrak. **Monthly Update:** • FAT testing of Amtrak/LIRR STS-STS interface started on April 29. • Amtrak recently requested MTA to modify the current STS-STS interface control specifications (ICD) due to technical issues with the interface to other NEC Railroads. MTA unwilling to jeopardize deadline; Amtrak agreed to ensure interface to MTA will work per original ICD. **Drivers:** • Changes to MTA's design for PTC security was required to meet Amtrak's standard for interoperability on NEC. • Deployment is dependent upon installation of SIM card installations for remote deployment of the security keys to all trains. **Mitigations:** • More extensive testing of HMAC prior to system integration. • MTA have an operational workaround for FRA review/approval should interface fail to be operational at end of 2020. • SI to delay the delivery of System Baseline 3.8 from May to June to compress the schedule. **Potential Impacts:** • Without remote deployment will take more time to update trains. • MTA will need to implement an operational mitigation if interface not available.
	Date Needed	
	Jun 2020 (LIRR) 3rd Qtr. (MNR)	

Red — Significant impact to Project Schedule and ability to meet PTC deadline.

Yellow — Impact to Project Schedule or interim project milestone and may impact ability to meet PTC deadline.

Green — No Near Term Impact to Project Schedule and on target to meet PTC deadline.

Key Milestones and Issues (LIRR & MNR)

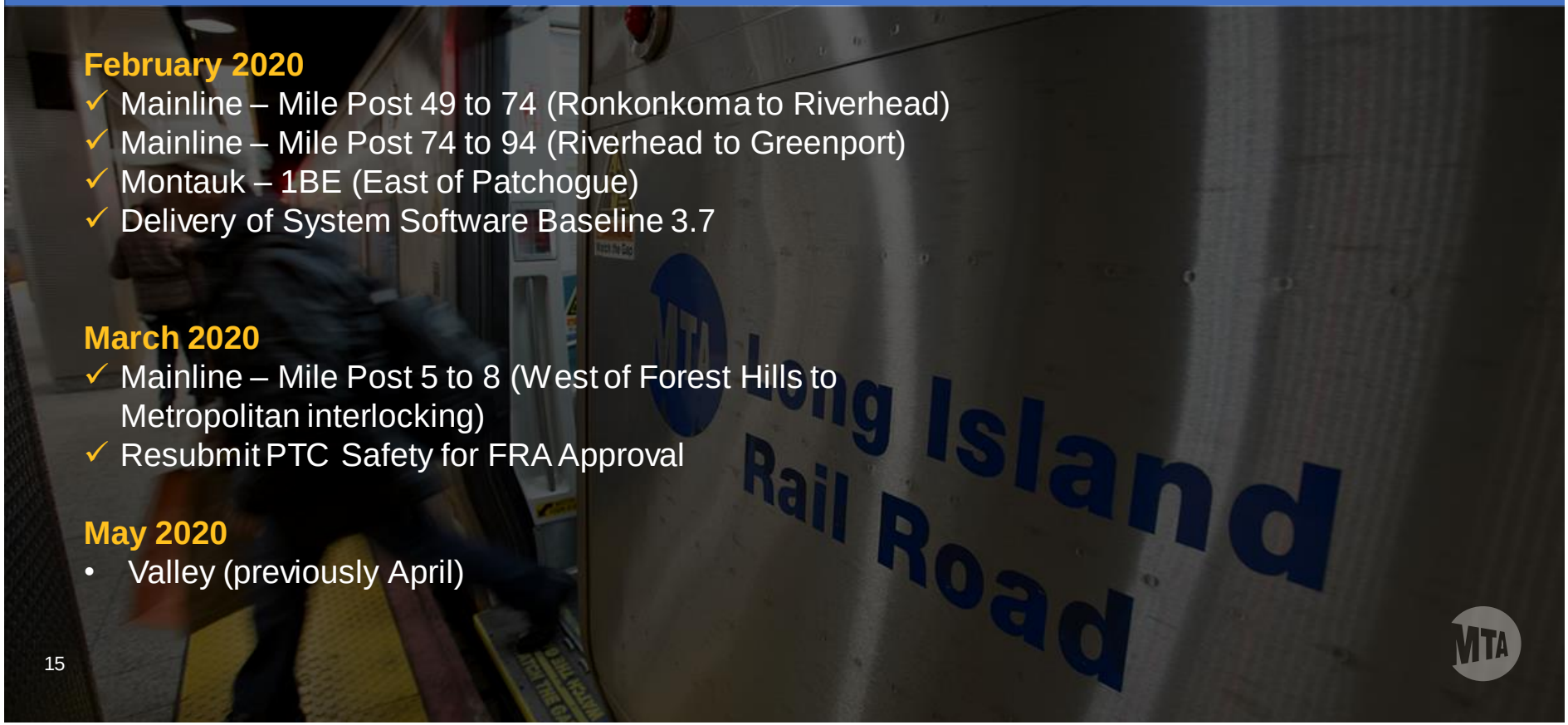
Status	Activity	Issues
Yellow	Delivery of material, installations, designs, testing activities are being impacted by COVID-19	Issues: • COVID-19 has had a negative impact on various project activities which jeopardizes Railroads' ability to meet interim project milestones. Monthly Update: • Both Railroad & SI PTC engineering personnel telecommuting which has had a minor impact to employee productivity levels but impacting critical path. • Only essential staff are being deployed to the office and factory. • Both Railroads have experienced impacts to installation and testing activities due unavailability of Force Account staffing due to positives/quarantines. • BT FAT Lab testing being remotely witnessed by the Railroads. • Following CDC guidelines, social distancing, wearing masks, regular sanitization of test trains, and limiting personnel in locomotive cabs to protect joint field personnel. • Several SI suppliers (overseas and outside NYS) declared shutdowns or slowdowns at beginning of pandemic and have subsequently resumed work – impacts are being assessed • Just –in-time transponder deliveries are being narrowly met by the SI • Material transportation from overseas are being closely monitored but to date, deliveries are supporting the project schedule. Drivers: • The FRA has not given any indication that there will be an extension to the PTC deadline due to COVID-19. Potential Impacts: • Continued delays to interim milestones increases likelihood of missing PTC deadline.
	Date Needed	
	Per CPM Schedule	

Red — Significant impact to Project Schedule and ability to meet PTC deadline.

Yellow — Impact to Project Schedule or interim project milestone and may impact ability to meet PTC deadline.

Green — No Near Term Impact to Project Schedule and on target to meet PTC deadline.

LIRR PTC ERSD Timeline and Look-ahead



February 2020

- ✓ Mainline – Mile Post 49 to 74 (Ronkonkoma to Riverhead)
- ✓ Mainline – Mile Post 74 to 94 (Riverhead to Greenport)
- ✓ Montauk – 1BE (East of Patchogue)
- ✓ Delivery of System Software Baseline 3.7

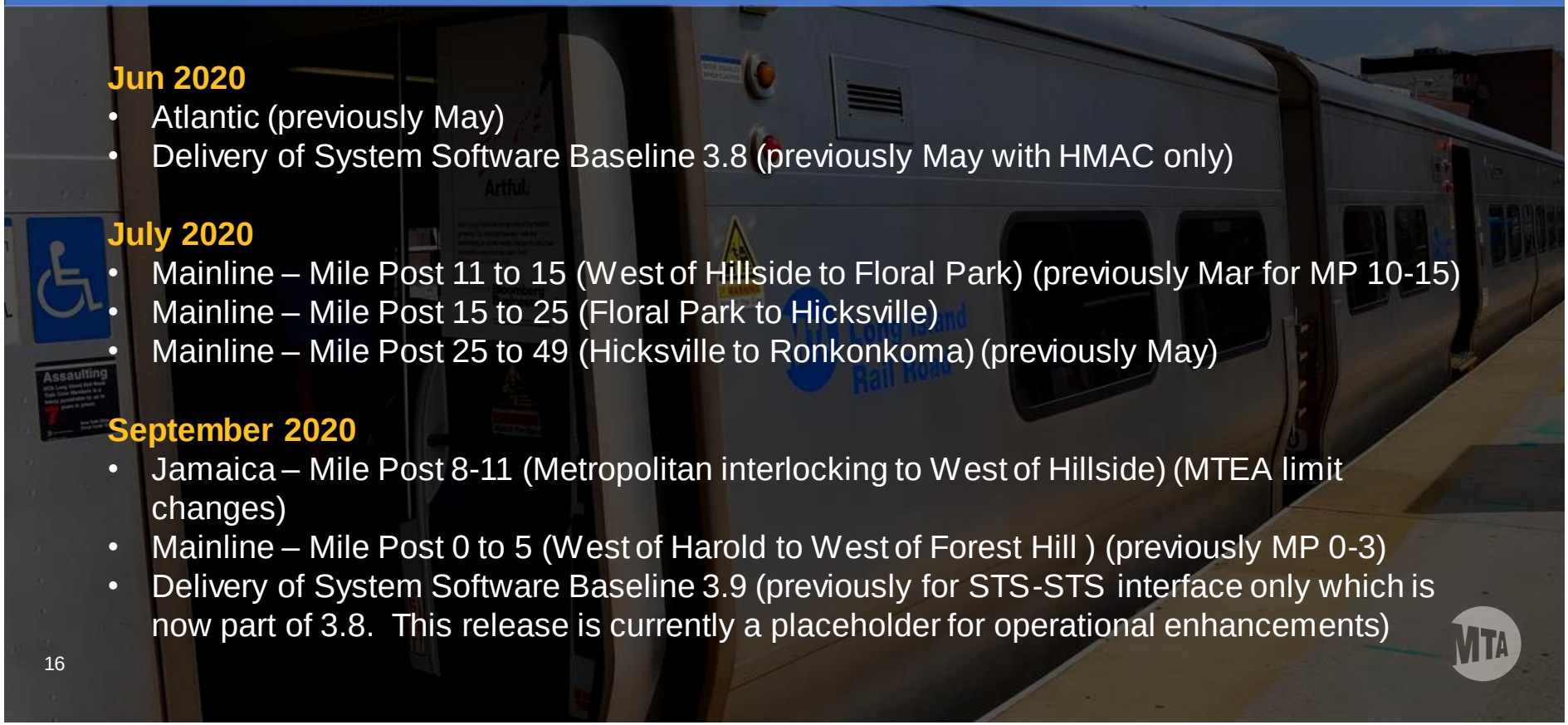
March 2020

- ✓ Mainline – Mile Post 5 to 8 (West of Forest Hills to Metropolitan interlocking)
- ✓ Resubmit PTC Safety for FRA Approval

May 2020

- Valley (previously April)

LIRR PTC ERSD Timeline and Look-ahead



Jun 2020

- Atlantic (previously May)
- Delivery of System Software Baseline 3.8 (previously May with HMAC only)

July 2020

- Mainline – Mile Post 11 to 15 (West of Hillside to Floral Park) (previously Mar for MP 10-15)
- Mainline – Mile Post 15 to 25 (Floral Park to Hicksville)
- Mainline – Mile Post 25 to 49 (Hicksville to Ronkonkoma) (previously May)

September 2020

- Jamaica – Mile Post 8-11 (Metropolitan interlocking to West of Hillside) (MTEA limit changes)
- Mainline – Mile Post 0 to 5 (West of Harold to West of Forest Hill) (previously MP 0-3)
- Delivery of System Software Baseline 3.9 (previously for STS-STS interface only which is now part of 3.8. This release is currently a placeholder for operational enhancements)

MNR Project Update

Segment in full PTC Functionality:

- Danbury Branch – 24.2 miles
- New Canaan Branch – 6.3 miles
- Hudson Line (CP3 – CP75) – 71.8 miles
- Harlem Line (CP106 – CP182) – 76.9 miles
- Hudson Line (GCT – CP3) – 3 miles
- New Haven Line (CP212 – CP230) – 18 miles (Placed into ERSD on Saturday May 9, 2020)

Note:
MNR is now in full PTC functionality for the entire Hudson/Harlem Line…Every H&H train that leaves GCT and/or outlining territories will be operating under full PTC Functionality .

PTC implementation Summary:

- Total route miles in full PTC – 202/244.3 miles (82%)
- Over 67,000 Revenue Trains ran in full PTC mode from August 2019 – April 2020
- Waterbury Branch is currently operating under PTC Main Line Track Exclusion Addendum
- Amtrak passenger trains (Rev10) are interoperable on the Hudson Line/day
- CSX and P&W freights (Rev10) are interoperable on the Hudson Line and Danbury Branch

MNR Project Update (continued)

Field Installation & Testing Activity:

- Completed transponder migration from CSE to full PTC on the NHL (CP212 – CP230)
  - Completed Site Performance Testing
  - ERSD May 9, 2020
- Completed transponder migration from CSE to full PTC on the NHL (CP255 – CP274)
  - Started transponder Site Integration testing week of May 11, 2020
- Started transponder migration from CSE to full PTC on the NHL (CP 235–CP 255) (217 new, 244 reprogram)
- Continue to mitigate technical and operational issues

Amtrak Boundary design/Commissioning Schedule

- Poughkeepsie – Completed and commissioned December 5, 2019
- Spuyten Duyvil - Commissioning target – May 2020 (slippage due to COVID 19)
- New Haven - Design completion target – 2nd quarter 2020
- New Rochelle - Design completion target – 2nd quarter 2020
- STS-STS interface – 3rd quarter of 2020
- Amtrak Rev 11.3 interoperability testing on MNR Hudson Line completed April 8, 2020.

MNR M8 Project Update

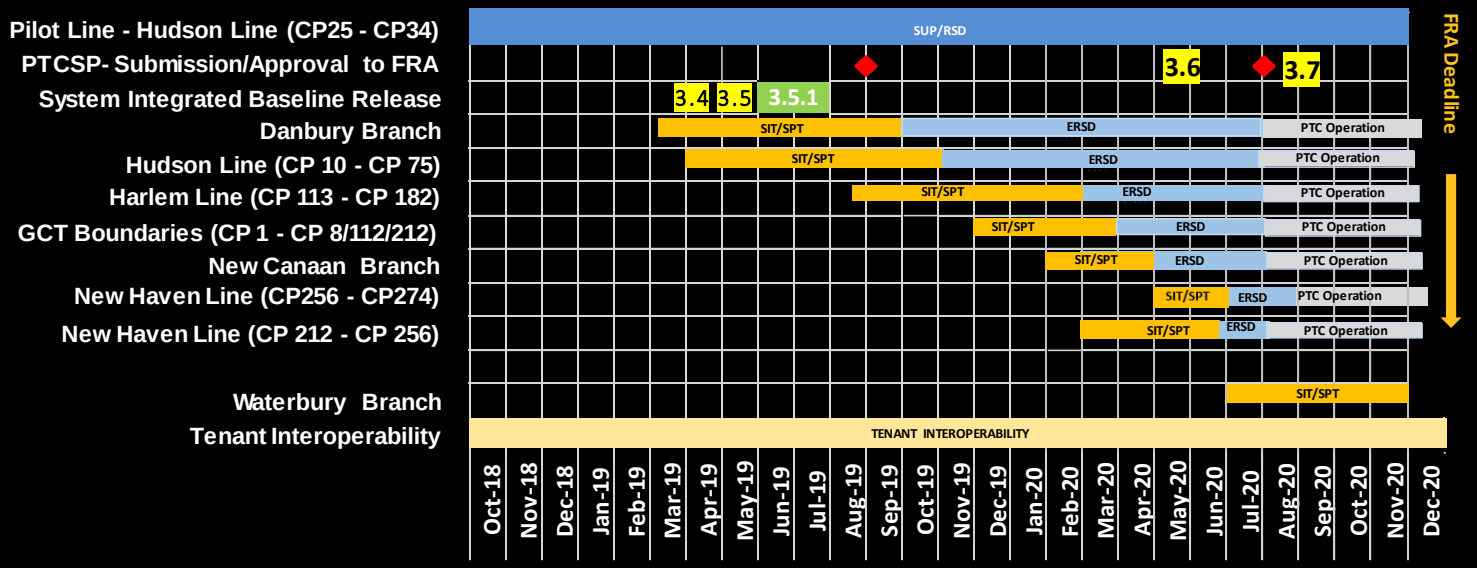
Current Project Status

- Completed field engineering testing of first OBC software release (Alpha I) with good test results.
- Commenced commissioning of Mobile Communications Package (MCP) on M8 Fleet – 50% completed
- Gap Analysis – Mitigation and Interoperability efforts continue

Upcoming Milestones

- Final Engineering SW release on May 27th and field testing to be completed. Alpha II is now identified as Beta I.
- Beta I not Alpha II scheduled for field testing week of June 1 2020
- Complete M8 Fleet MCP commissioning July 2020
- M8 Safety Cert expected Sept 2020

MNR Working Schedule and Sequence

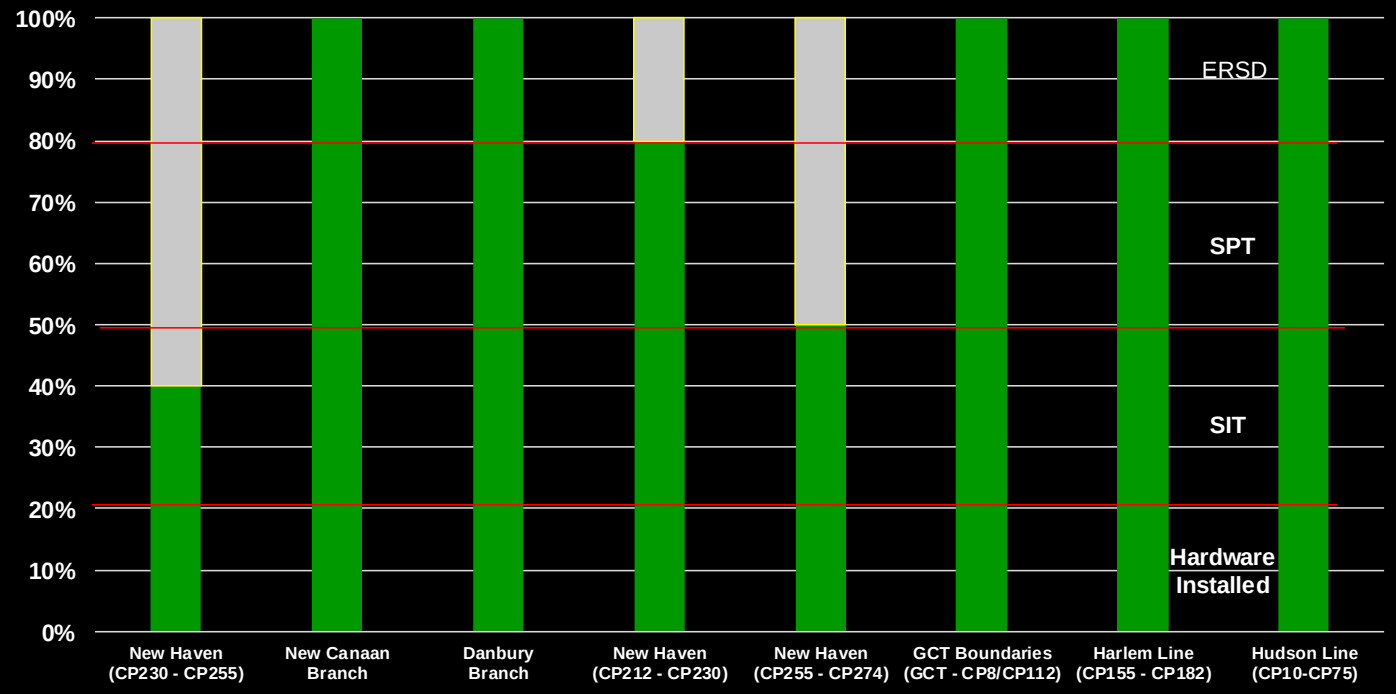


SIT - Site Integration Testing/SUP -Site Update Period/RSD - Revenue Service Demonstration/SPT – Site Performance Test

ERSD - Extended Revenue Service Demonstration

Waterbury - Installing Signal System along with PTC (MTEA)

MNR Segment RSD Readiness



SIT = Site Integration Testing, SPT = Site Performance Testing, ERSD = Extended Revenue Service Demonstration.

Key Milestones and Issues (MNR Only)

Status	Activity	Issues
Green (Current) Yellow (Previous)	Integration for the M8 OBC into the MNR Wayside	**Issues**: • Commence M8 Fleet Hardware and Software Upgrade for full PTC Operability • Complete Gap analysis, design and implement mitigating measures • Complete M8 OBC Qualification and Integration Testing in MNR / BT Wayside Environment **Monthly Update:** • Weekly Progress Meetings between MNR/Kawasaki/Alstom • Testing of final Engineering Release of full PTC functional Software – 1st Week June 2020 • Continued OBC Software development and finalization of upgraded hardware to begin fleet upgrade **Drivers:** • Hardware Component production/availability for upgrade of OBC • Complete SLR Review/Update, SI M8 SPT test Procedure, and Gap Analysis • Complete and provide MNR wayside PTC design information for use in definition of M8 OBC testing **Mitigations:** • Complete design for mitigations defined in the Gap analysis and implement into wayside environment • Define most effective means for PTC hardware and software upgrade of the 190 M8 pairs to include upgrade of the additional 33 M8 pairs being delivered in 2020 **Potential Impacts:** • Potential risk of not completing entire M8 fleet with both hardware and software PTC upgrades
Date Needed		
June 2020		

Red – Significant impact to Project Schedule and ability to meet PTC deadline.

Yellow – Impact to Project Schedule or interim project milestone and may impact ability to meet PTC deadline.

Green – No Near Term Impact to Project Schedule and on target to meet PTC deadline.

MNR PTC ERSD Timeline

December 2019
- ✓ Harlem Line: Southeast (CP155) – Wassaic (CP182) - 27 miles

January 2020
- ✓ Harlem Line: Mount Vernon (CP113) – Southeast (CP155) – 69 miles

March 2020
- ✓ Hudson Line: Marble Hill (CP10) – GCT (CP1) – 10 miles
- ✓ Harlem Line: Mount Vernon West (CP113) – Melrose (CP106) – 7 miles
- ✓ New Canaan Branch – 6 miles

May 2020
- ✓ New Haven Line: (CP212) – (CP230) – 18 miles
- Re-submit PTC Safety Plan

June - August 2020
- New Haven Line: (CP255 - CP274) - 19 miles
- New Haven Line: (CP230 – CP255) – 25 miles

May 2020 CPOC Independent Engineering Consultant Project Review

Positive Train Control

McKissack
MTA Independent Engineering Consultant

Budget Review

- The current budget is $1,086M.
- Additional funds ($41M for LIRR and $32M for MNR) are required to support project needs until completion.
  - The IEC will review the budget increase requests to determine if they are sufficient to cover project needs.

Schedule Review

- Both LIRR and MNR continue to progress scheduled activities to place remaining line segments and branches into E-RSD.
  - LIRR has rescheduled E-RSD for a number of branches and line segments to address accurate stop issues and simplify boundaries between line segments. This will benefit operation.
  - Harold & Jamaica E-RSDs are on the critical path (9/20 start) for LIRR.
- MNR is progressing plan to integrate M8 fleet into PTC operation.
  - Requires software and upgraded hardware from Alstom.
  - E-RSD for New Haven Line is scheduled in May-June 2020, using P-32 diesel trains.
- Amtrak developed a two-phase plan to achieve interoperability with Harold PTC installation.
  - Phase I will implement workaround requirements:
    - Development & testing tasks are scheduled to be completed in June.
    - Requires written approval by FRA.
  - Phase II is scheduled for mid 2021, and will achieve full interoperability.

IEC Observations – COVID-19

- SI and project team have taken measures to minimize the impact of COVID-19 on scheduled activities, including implementation of remote testing and monitoring.
- Project team & SI have indicated impacts on field installation/testing and subcontractor's software development (not on critical path).
- Supply chain issues have impacted upgraded hardware for M8.

IEC Observations

- SI successfully completed software release 3.7 (LIRR).
  - This reduces the risk of SI software development on achieving compliance by December 2020.
  - SI software activities are now focused on encryption and interoperability functions.
- The SI completed the initial corrective actions to the Scanner Antennas and CTV Units.
  - New issues affecting PTC departure test were observed and are currently being addressed by the SI and the R/Rs.
- SI made good progress in development and testing of STS software based on an initial Interface Control Document (ICD) provided by Amtrak. However, Amtrak has recently requested modification to the ICD.
  - LIRR & MNR rejected Amtrak's request and indicated that they have received a commitment from Amtrak to establish two different standards for the North East Corridor and to support the R/Rs STS testing.

IEC Observations

- LIRR resubmitted safety plan to FRA in March after addressing FRA's comments.
- MNR held a meeting with FRA to discuss comments on safety plan, and is currently revising the plan to resubmit to the FRA in May.

Project Risks

- Integrating the M8 fleet into PTC operation is dependent on receiving fully functioning software and upgraded hardware from Alstom.
  - Manufacturing and delivery of upgraded hardware is currently being impacted by supply chain. This issue is now on the critical path for compliance.
  - Testing of the Alstom software is based on a three-phase plan. An advanced software version to be tested by the SI is delayed to July. The SI is considering measures to minimize the delay impact.

MTA Construction & Development

Board Update: Signals & Train Control

May 11, 2020

A. Projects Summary

Similar to reports from Construction & Development (C&D) in the March book (on stations projects) and the draft report for the April meeting (on Infrastructure projects) this presentation combines all of the capital projects across all of the MTA that involve Signals & Train Controls, with the exception of Positive Train Control (PTC).

Across all project stages, Agencies and Capital Programs, a total of 111 projects are being advanced with a total value of $7.043 Billion. Of these projects, 46 are currently in construction with a current value of $3.678 billion. While C&D are continuing a systematic assessment of these projects, two projects (QBL West and Bus Radio Upgrade) exceed their initial budget or schedule and are subject to addition oversight and management support – details are provided later in this document.

Agency	Design		Procurement		Construction		Closeout	
	Projects	$ Value (M)	Projects	$ Value (M)	Projects	$ Value (M)	Projects	$ Value (M)
NYCT	33	$743	11	$1,035	41	$3,360	14	$1,299
LIRR	2	$38	0	$0	4	$150	4	$107
MNR	1	$143	0	$0	1	$168	0	$0
Total	**36**	**$924**	**11**	**$1,035**	**46**	**$3,678**	**18**	**$1,406**

Though most projects have progressed under the current COVID 19 conditions, which is considered a Force Majeure event in our construction contracts, we anticipate awarding time extensions to a number of projects to account for impacts to projects. In some projects, notably Culver CBTC, several weekend track outages were cancelled because of the COVID 19 events – we continue to evaluate opportunities to reconvene these outages to ensure projects will finish on schedule but also for opportunities to provide additional outages given the current ridership circumstances.

- Design – Of the 36 design projects two are affected by telecommuting; design review meetings are being held remotely
- Procurement – all 11 projects are on hold due to the 60-day procurement pause
- Construction – Of the total 46 projects, four projects have issues that may affect cost or schedule by more than 5%; three projects are trending notably ahead of schedule and budget
- Closeout – Primary issues affecting closeout are the slow pace of as-built drawing submittal, pace of reviews and the resolution of user punch list items

B. Key Project Updates and Notable Accomplishments

Third CBTC Supplier	• Mitsubishi has achieved a major milestone and qualified as a supplier to MTA for CBTC equipment including zone controllers and carborne equipment. This increases to three the number of qualified firms and the potential for increased competition on future CBTC project.
Eighth Avenue CBTC for NYCT	• $733.5M project awarded earlier this year and scheduled to finish in 2025 • Drawing from our experience with CBTC on the QBL and Canarsie lines, we selected an innovative A+B contracting structure when awarding the Eighth Ave CBTC contract back in January. By valuing both the bid price (A) and the cost of the track outages (B), the Eighth Ave CBTC bidders had to bid the cost of the outages. This is ultimately translating into a $30M savings • Axle counters are being used for the first time allowing for faster deployment of CBTC as it is independent of the existing track circuits • We are advancing this project in close cooperation with the contractor to ensure we continue to bring lessons learned from other CBTC projects
Centralized Train Control – Movement Bureau Theater space for LIRR	• In 2019, LIRR successfully completed construction of the Centralized Train Control – Movement Bureau Theater space, an important milestone in the railroad's efforts toward Centralized Train Control [CTC] and tower migration into the central control facility in Jamaica • The project included the fit out of the 6th and 7th floors in the JCC building and the relocation of the Movement Bureau, Power and Signal Control Desk and the Incident Command Control Center into one location • Project created a greater concentration of the LIRR's train dispatching and supervision functions within a single location and will lead to enhanced reliability in dispatch control
New Cab Signal System from Suffern to Port Jervis for Metro-North	• Metro-North has taken Beneficial Use of a new cab signal system on the Port Jervis Line from Suffern, New York to Port Jervis on the Port Jervis Line serving Rockland and Orange Counties. This $67.6 million project includes new signal and communication houses and cases, snow-melter systems, power distribution and generation equipment • The project is a key component of Metro-North's Positive Train Control system
Queens Boulevard West CBTC for NYCT	• This project will overlay the Queens Blvd. Line with CBTC signaling from Union Turnpike to 50th St, Manhattan on the 8th Avenue line. Three contracts were awarded: Siemens and Thales are suppliers, and LK Comstock is the installer as well as the designer and supplier of AWS equipment • The overall project is 67% complete

- QBL is the first interoperable CBTC contract implemented into NYCT (Thales and Siemens). Interoperability will allow flexibility of train operation through different lines and will provide for more competitive bidding for future CBTC contracts
- Several milestones have recently been accomplished, including:
  - Completed testing of section 3 radios and fiber cables back to RCC
  - Completed Zone Controller testing for 5th Ave. and Lexington Ave
  - 283 R160 units are retrofitted and tested
  - 200+ R160 units safety certified

Bus Radio Upgrade for NYCT

- NYCT is designing and building a new digital radio system for all buses in the NYCT and MTA bus fleets. The contract was awarded to Parsons Transportation Group (PTG) in March 2016. The work consists of constructing 36 new radio base stations sites throughout the five boroughs on properties owned or leased

New Video Wall in Bus Command Center (East Side)

by the MTA, the retrofitting of all buses and non-revenue vehicles with new radio equipment, and the furnishing of a new radio control and dispatch system in the new Bus Command CenterThe Staten Island Pilot is underway. We have commissioned 6 base stations, completed the first phase of the radio installation on 273 buses (35% more buses than are contractually required for the pilot), collaborating closely with the Department of Buses

Ultra-Wide Band Pilot for NYCT

- The CBTC systems installed on current projects at NYCT utilize wayside transponders for train location determination, supplemented by speed sensors to establish train location between transponders. UWB can replace the

transponder-based train localization systems if the UWB-based train positioning system can be safety certified. In addition to permitting simpler carborne installation, UWB systems provide a more accurate positioning system

- Two UWB pilot projects have completed their major works and will complete data collection in June 2020. Both projects, which utilized different companies and technology, have shown that UWB is effective in determining the locations of trains, and one company believes it can achieve safety certifiability. Once all data collection has been completed UWB will have a statistically significant number of train movements to facilitate deployment on other projects
- Having proven UWB's effectiveness, we are now looking at use on future projects. In the immediate future, we are advancing interoperability standards
- The UWB Pilot Program has allowed us to explore several new innovations that add value when used together with UWB (like LIDAR, RADAR, HD Cameras). For instance, we've installed inertial sensors on trains on QBL to measure the comfort level of passengers

Plot of level for passengers from inertial sensors.

C. Projects with Notable Schedule or Cost Change

Queens Boulevard West CBTC for NYCT

- The project "in service" date is projected to be delayed by up to a six-months due to:
  - Problems with the reliability of hardware and software that have delayed safety certification
  - Covid-19 has restricted access to laboratories in Toronto, France, and New York
- Internal TAL costs have exceeded initial estimates currently by $45M and may increase further because:

- The initial budget assumptions were incorrect and inconsistent with day-to-day RTO requirements
- Outage extents were increased to facilitate construction and maintenance for adjacent projects

- Mitigation measures
  - We have successfully worked with suppliers to address issues and revise their delivery schedule. The full impact of the delay will be assessed once the first section is placed into service and the Covid-19 impacts are bounded
  - C&D has recently reviewed the process by which TAL costs are monitored and reported on construction projects. As a result, new measures are being put in place to align budgets and expenditure and to provide quicker data to project managers and oversight staff to enable accountability.

Bus Radio Upgrade for NYCT

- Substantial Completion has slipped 6-9 months to June 2021 due to:
  - Ability of General Contractor PTG to manage the project effectively
  - Permits and approvals for some tower sites resulting from modifications initiated by PTG
  - Modifications at two sites to accommodate third party changes/approvals
  - COVID-19 delayed the replacement of the deteriorated radio tower at the East New York Yard, although work has now resumed
- Mitigation measures
  - We continue to hold executive meetings with the PTG CEO and President to address the schedule slippage and discuss the efforts needed to complete the work
  - PTG has made changes to the project's senior management team, and is assigning additional personnel with strong construction management experience to manage the field activities
  - We have developed a remaining work schedule to complete the project and have held discussions with Parsons to ensure that they provide the necessary management and labor resources to complete the job
  - Recently added a CCM to help actively manage the construction efforts and address issues in an expedited manner
  - NYCT has identified a location for the radio base station in Yonkers and the MTA Board has already approved the real estate action needed to lease the roof-top space
  - Known technical issues seem to have been resolved for the time being, but we're monitoring aggressively until final testing and integration

May 2020 Project Review Summary Independent Engineering Consultant

A summary of following IEC monitored Projects:

- 8th Avenue CBTC-Design, Furnish & Install Program
- Communications Based Train Control (CBTC) Queens Blvd. Line (QBL)-Design, Furnish & Install
- Culver CBTC
- CBTC Interoperability
- ISIM B Module 3
- Bus Radio System (Design/Build)

8th Avenue CBTC-Design, Furnish & Install Program

Budget:

- Total approved cost estimate is $733.5M. The current budget is $590.3M. C & D will be adding $143.5M to meet the project estimate at completion.

Schedule:

- Notice to proceed was issued January 11, 2020, with a contract duration of 60 months and a substantial completion date of January 11, 2025.

Project Risks:

- Testing and commissioning of the system.

Observations:

- Contractor is performing similar work on QBL CBTC project and the experience there should improve the learning curve.
- This project has interfaces and dependencies on other contracts including QBL, the delivery of new subway cars equipped with CBTC hardware and the data communications system.
- Installation of axle counters to replace track circuits is a technology change that will require an organizational culture shift, a familiarization process and modification to the I2 Specifications.

CBTC-QBL Design, Furnish & Install Program

Budget:

- Agency is progressing a budget modification of $45M to cover additional TA Services to support testing and commissioning, thereby increasing the budget and EAC to $708M. The IEC has reviewed third party, soft costs and contingency and believes that this is sufficient to cover the estimated cost up to March 2021.
  - This $708M budget does not cover the cost of the schedule slip from March to September 2021.

Schedule:

- Based on the April 2020 Integrated Project Schedule (IPS) full CBTC in-service for the design and furnish contract is currently forecast for September 2021, a 6-month slip from the baseline schedule.

CBTC-QBL Design, Furnish & Install Program

Project Risks:

- Hardware and software defects affecting the availability and reliability of car-borne and wayside systems.
- Post-survey track layout changes requiring database modifications by Siemens thereby delaying software development and deployment by Thales.
- Testing durations being compressed and not allowing sufficient time for regression testing thereby further placing the CBTC system full in-service by September 2021 at risk.

Mitigations:

- The project team is requesting contractors to provide additional resources in New York to address software issues.
- C&D is requesting that the install contractor provides additional shifts to mitigate delays in completing installation in relay rooms in section 2.

Observations:

- The install and removal contractor must complete all installations by November 2020 to allow Siemens to commence testing of all CBTC wayside equipment to avoid any further delays.
- Delays in placing QBL CBTC into full service could affect other CBTC projects, such as the Culver Line.

CBTC Culver Line Project

Budget:

- Based on the IEC review of the project third party contract, soft costs and project contingency, the IEC agrees that the project EAC remains within the current budget of $482M.

Schedule:

- IEC analysis indicates that the project is proceeding on time in accordance with the CPM schedule update (data date 3/31/2020). Invoiced expenditures of 24% vs 34% time expended is in line with a design/build contract.

Project Risk:

- There is a dependency on software being tested and deployed on CBTC QBL project.

Third CBTC Supplier Qualification-Mitsubishi

Budget:

- Based on the IEC review of the project third party contract, soft costs and project contingency, we find the project EAC remains within the current budget of $20M.

Schedule:

- Mitsubishi Electric has met interface and interoperability specifications (I^2S) requirements and achieved substantial completion in April 2020, allowing the contractor to bid for future CBTC projects; this expands the field of competition for CBTC Programs.

ISIM-B Module 3: Large Screen Display and Data Warehouse

Budget:

- Based on the IEC review of the project third party contract, soft costs and project contingency, we find the project EAC remains within the current budget of $103M.

Schedule:

- Based on the IEC review of CPM schedule update #11(April 2020), we find that the project is on schedule to meet substantial completion by December 2022.

Project Risks:

- Relocation of the Data Warehouse Development System(DWDS) from RCC to 2 Broadway may add cost to the project.
- Delays in receiving Interface Design Documentation (IDD) from ATS and other legacy systems.

Mitigations:

- NYCT will mitigate the relocation of the DWDS by making it easier for MTA IT personnel to gain access to it at 2 Broadway reducing the need for formal training.
- NYCT will allow the contractor access to the ATS simulator used for training purposes to assist in developing this interface to ATS. In addition the contractor is reverse engineering the IDD for some legacy systems.

Bus Radio System (Design/Build)

Budget:

- Project budget has been increased by $11.5M to $291M since the last report, for the cost of adding a 3rd party Consultant Construction Manager (CCM). A budget modification for the expected additional force account expenditure of $3.5M is in process.

Schedule:

- Field progress is at 51%, while 84% of project time has elapsed (construction of 20 base stations has not yet begun). The IEC's analysis of the submitted contractor's schedule shows substantial completion could be delayed by as much as 11 months.

Project Risks:

- Risks of delays due to issues with base station installations, bus retrofits and pilot testing have been realized; as this is a design/build project, risk allocation for sharing the cost of delays must be settled between the parties.

Observation:

- While just hired, the CCM is making a positive impact on the project, such as a marked improvement in the disposition of RFIs and submittals.

Recommendation:

- The IEC recommends that a schedule with realistic milestones and activity durations be negotiated, and shorter look ahead schedule activities be completed as soon as possible.